The Kilo Doctrine

A Guide to Kilo Tactics

By TLAM Strike

“Better is the enemy of good enough.”
-Admiral Sergei Gorshkov

“She’s low tech, her sensors are third world, and she’s not especially fast. The thing is on electric motors she’s the second quietest submarine ever built… next to us.”
-Master Chief Jollen

Table of Contents

Introduction
Before you leave port
Nuc vs Diesel, a basic comparison
Kilo Specifications
Operating on or near the surface
-Rig ship for heavy rolls!
-Air/Surface Search with the Mark 1 Mod 0 Eyeball
-Transiting
-Zen and the art of a battery charge
-Arctic Operations or how I joined the North Pacific Yacht Club
Multiplayer and Multistation
-Interfleet communications with the chatbox
-Intership communications with the chatbox
-Multistation and maximizing search capabilities
The Sensor Package
-SONAR
--Using the SSAZ and FRAZ Sonar Displays
-Electronic Warfare
-Periscope and Standimeter
--Old School Firing Solutions
Weapons
-Direct Hit! Sending the enemy to the bottom
-Making the attack
-The Klub missile system
-The SS-N-15 Starfish
-Kilo Torpedo Armament
-Kilo SAM Armament
Group Tactics
-Cooperating with Diesels
-Cooperating with Nuclear Submarines
--Defending a Boomer
--Working with a Fast Attack
-Operating with surface ships
-Cooperating with ASW Aircraft
Help there is an enemy nuclear submarine after me!
How do I hunt an enemy diesel submarine?
Help I'm being engaged by enemy ASW forces!
-Enemy ASW Search Tactics
-Fixedwing ASW
-Rotary ASW
-Torpedoes from surface ships
-Torpedoes from aircraft
-Anti-Submarine Rockets
--Types of ASROCS
-Depth Charges

Special Operations
Going where nucs fear to tread
Conn Sonar Crazy Ivan!!
Someone just dropped 45 cents… Pulling a “Down Periscope”
When the $#!% hits the fan
-So they’ve deployed everything they have against you
-So you’ve been “worn out”
Conclusion
-Ok just what are the advantages of the Kilo?
-Things to remember
Appendix A
-Types of torpedoes used by Surface and Air ASW forces
Appendix B
-Surface ship decoys
Appendix C
-Your counterparts
Appendix D
-Bow Wave Reference
“I will require the names of those responsible!”

Introduction

"No offense to the USS Rustolum here but I be better off the *Merrimac*! I've been trained to command a nuclear boat."- LT. Cmr. Tom Dodge, *Down Periscope*

The three nuc boats in Dangerous Waters are fairly similar in terms of tactics, which have been covered in documents such as the TACMAN, and Bluebook. The Kilo on the other hand is quite different since she is a Diesel-Electric submarine, requiring the Kilo Skipper to have a different mindset than his nuc counterpart. Everything the Diesel Skipper does must be done with his battery and limitations of his boat in mind. In this document I hope to help you develop this mindset and learn the tactics of handling a Kilo submarine in battle and the tactics and weaponry enemy ASW forces may use against you. This document is written with LWAMI Realism Mod in mind, while it maybe applicable to the stock game some statistics maybe off.

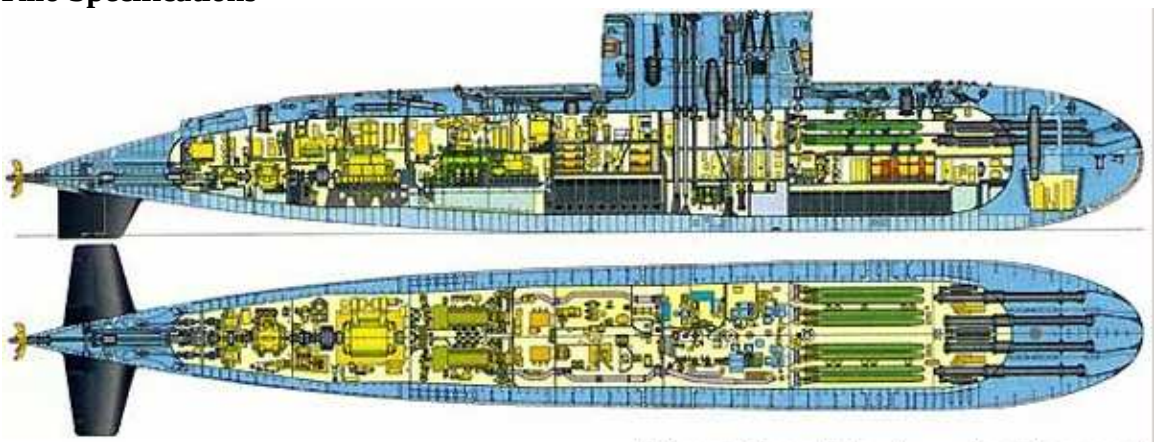
Before you leave port

Before you go out on patrol there are a few things that are helpful. Some of the things on the Kilo require a more 'old school' approach. Things to get the next time you at the store, a small notepad (a simple 1 subject notebook or legal pad), a cheap battery powered calculator (one of those that run on an AA battery you get at the dollar stores, battery powered since you may play with the lights out), a stopwatch (again one from the dollar store or your wristwatch if you have one), and a pencil (mechanical is best IMHO. They don't fail to write if its cold or they have been sitting around a while like a pen). These will be helpful in figuring manual solutions and making maneuvers.

Nuc vs Diesel, a basic comparison

Ok maybe you're totally new to the whole submarine thing, in that case welcome aboard! In SCS-Dangerous Waters there are two types of submarines you can drive, Nuclear ones which are powered by a nuclear reactor and Conventional ones ("Diesels") which are powered by a diesel-electric drive. Nuclear submarines have the advantage of high speed and long endurance (they are capable of going months at full speed). Nucs also tend to have a large number of weapons and more advanced sensors. Diesels are smaller, while dived they run off batteries and while surfaced (or at snorkel depth) run on diesel engines. They tend to have fewer weapons and less advanced sensors but they are quieter than nucs while running on batteries and do not require as many crew. Nuclear submarines are used only by the major world powers (US, UK, France, Russia, China and India); diesel submarines are much the weapons of the underdog their low cost makes them within the reach of less powerful nations. Some nations operate both Nuclear and Diesel submarines for example China operates over 50 diesel submarines and 6 nuclear submarines. The Soviet Union at the height of its power had some 360 submarines with half of them diesels. The USA on the other hand has around 70 nucs and only 1 diesel.

Kilo Specifications



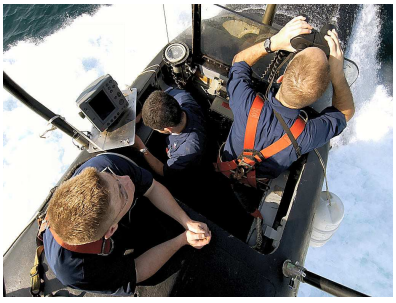
The Project 877 *Paltus* class (Kilo) and Project 636 *Vashavyanka* class (Kilo Improved) is an advanced medium range submarine designed by the then Soviet Union and first launched around 1982. Meant to replace the older Whiskey and Romeo class submarines it has been exported 6 nations with others interested in the purchase of units. The basic specifications of the Kilo are as follows:
Displacement: 2,325 Tons Surfaced / 3,076 Tons Dived
Length, Feet (Meters): 238.2 (72.6)
Beam, Feet (Meters): 32.5 (9.9)
Draught, Feet (Meters): 21.7 (6.6)
Speed, knots: 10 surfaced, 17 Dived (20 Dived Kilo Improved)
Range, miles: 6,000nm at 7 kts Snorkeling (7,500nm on Kilo Improved); 400nm at 3 kts on batteries.
Endurance: 45 days
Crush Depth: ~328 meters. (Varies every game)
Machinery: 2 Type 4-2AA-42M turbocharged diesel generator sets, 2 PG-141M electric motors, 1 6-blade prop (7-blade on Kilo Improved), 1 MT-140 electric low-speed motor, 2 MT-168 internal electric creep motors, 2 ducted props.
Crew: 12 officers, 41-45 enlisted (avg complement 13 Officers, 12 Warrant officers (Michmanii), 12 Petty Officers (Starshinii), 15 Non Rated (Matros))
Weapons:
6 533mm torpedo tubes capable of firing torpedoes and mines. Anti-submarine missile, and cruise missile capability on some. 12 Torpedo racks. 1 SA-N-5 or SA-N-8 MANPAD SAM position in the sail.
Sensors:
Radars:
Surface Search- MRP-25 Snoop Tray or MRK-50 Albatros' Snoop Tray 2
EW:
MRM-25EM Squid Head ESM and 6701E Quad Loop D/F (on some)
Sonars:
MGK-400 Rubikon Shark Teeth/Shark Fin or Shark Gill; hull mounted. Mouse Roar MG-519; HF object avoidance, MG-553 sound-velocity measurement, MG-512 self-cavitation measurement

Operating on or near the surface

Rig ship for heavy rolls!

Unlike the other submarines in DW the Kilo will spend a portion of its time on the surface doing things other than just entering/exiting port. 90% of the time you're operating on the surface you will be running on diesels. One diesel engine will drive the boat at a speed of 3 knots at 1/3rd, 5 knots at 2/3rds and 8 knots at Standard speed. Two diesels will drive the boat at a speed of 7 knots at 1/3rd, 9 knots at 2/3rds and 10 knots at standard speed. Generally running at standard or higher (speeds higher than standard are unnecessary while surfaced) should only be done surfaced since at 10 knots the snorkel will snap off. In some weather conditions running on diesels is problematic with high sea states (5 or higher) water can wash over the snorkel mast shutting down the diesels and in really bad conditions at high speeds break the mast, making a turn dived can also cause water to wash over the snorkel, since in DW the snorkel is the only induction for the diesel engines having that broken will make it impossible to run the diesels. In such adverse weather conditions run at 1/3rd on both engines so that if the snorkel gets dunked you are going slow enough that the mast probably will no be damaged. Also running at 1/3rd means your battery is being charged so you can dive again, which is what you should do in bad weather. In Seastate 5 or greater it maybe difficult to maintain course at 1/3 speed surfaced (even at 2/3rds you can drift 10 degrees) and the wave action can cause the bow to plow in to a shallow seafloor, operate with this in mind. Some mission designers will add strong currents near PD that combined with high seastates can push a sub down from the surface. Do no operate surfaced in heavily trafficked or shallow areas in adverse weather. Being surfaced in adverse weather in heavily trafficked areas in a big no no. Your sonar is not very useful, you can't hold a straight course and visibility is bad. In that situation you're Radar maybe your only protection but there is a limit on the conditions you can use the Radar in, if water washes over the Radar's parabolic dish while it in operation it will fry also the max speed the radar mast can handle is 8 knots dived.

Air/Surface Search with the Mark 1 Mod 0 Eyeball



While operating on the surface you will need to keep an eye out for aircraft and distant ships, as discussed latter P-3 and MH-60 players tend to fly under EMCON to avoid detection and engagement by MANPAD SAMs fired from your sail. During daylight hours an aircraft maybe very faint with its gray and white paint, the Night Vision mode on your binoculars can provide better contrast on a distant aircraft. Now when you're in the sail you are the only lookout so you

will have to search 360 degrees while in real life you would only search 100-200 degrees. The proper procedure to search is:

"…Each lookout searches his sector in the following sequence:

a. Search the water to the horizon for one-half of his assigned sector.

b. Lower the binoculars for approximately 10 seconds to survey entire sector, water, and sky, with naked eye. Continue search of water to horizon over the remainder of the sector. Search the horizon and lower sky for one-half of the assigned sector. Lower binoculars for approximately 10 seconds to survey the entire sector, water and sky with the naked eye. Continue search of the horizon and lower sky over the remainder of the sector. Repeat 10-second sweep of the entire sector with naked eye. Search the upper sky, above the belt observed when searching the horizon and lower sky, for one-half of assigned sector. Lower binoculars for approximately 10 seconds to survey the entire sector, water and sky, with naked eye. Continue search of upper sky for remainder of sector. Repeat 10-second sweep of entire sector with naked eye. Recommence, starting with (a) above."

This procedure helps prevent you from missing a contact by only using your binoculars and searching a narrow view. This has been the procedure in the US Submarine Service since before WWII and it works. Remember <u>when in doubt: dive</u>.

"So I'm a Kilo boat and I manage to sneak out of the Med, naturally I'm going to assume every swinging dick in the US Navy is trying to find me. So I play hide-and-seek, my best speed isn't 19 knots its 10 and I sprint from layer to layer, and I'm getting real paranoid playing hide-and-seek…"
- Master Chief Jollen, <u>*Silent Steel*</u>

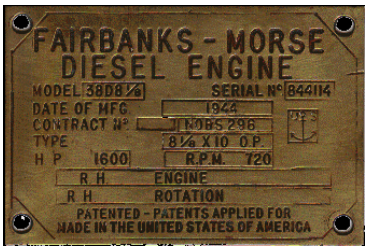
Transiting

All subs have a 'Standard' speed (15 knots) this is meant to be the submarine's cruising speed however for the Kilo this is not truly the case, in all practicality the 'Standard' speed for a transiting Kilo is 7 to 10 knots this allows for a good balance between distance traveled vs. time in transit vs. amount of battery power used vs. sonar washout. At some point in a long mission (talking about a mission spanning several hundred nms) you are going to have to run on Diesels unless you can spend the whole mission at 3 knots (a Kilo should be able to transit 400 nm at 3 knots but I don't know if anyone has yet tested this since it would take 5 ½ days in game time.) A fishing boat is the a great buddy to have when charging diesels in a MP game the 1st two tonals of a Kilo and Fishing boat are the same (50 and 125 Hz) unfortunately the only ships that match the Kilo's 3rd tonal (340 Hz) are warships and submarines which would be hard to hide behind unless they are on your side, at which point they would draw fire.

Zen and the art of a battery charge

Diesel Engines on RAN Collins class Submarine.

Now that you have a nice fishing boat to hide behind you can fire up your diesels. One tactic is alternating driving the boat and charging with diesels to maintain station on the fishing boat, once you speed tops off go all stop and coast. If



there is someone tracking you (always assume you are being tracked!) they will see the on off pattern which can resemble a surface ship if they are not looking too closely… if they are looking to closely put the fishing boat between you and the incoming. A nice noisy shallow place is perfect for charging batteries the noise helps dampen your signal and the shallow water lessens how far your signal travels. But be careful according to Rear Admiral W. J. Holland USN (Ret) (Battling the Battery Boats from *Proceedings* June '97) "Out to 50 fathoms [300 feet or 90 meters] or so, the bottom and surface form a superb sound channel. This channel may be full of noise from the beach, surf, and inshore engines, but if the bottom is hard and the surface not too choppy, sound propagation is better than in most surface ducts. Snorkeling in such a duct with the listening device to seaward is almost sure to result in detection, and if aircraft are available, quick localization" Generally you will not know the sea floor conditions unless you designed the mission or the designer mentioned it in the briefing, your only hint maybe the strength of a distant contact. Take the time with the mission editor to see how the bottom affects merchant traffic at 10, 15 and 20 nm. Determining the bottom type is one shred of data that enemy players might not have. Also obviously sound can't travel far though solid matter a nice shallow atoll or island group is fantastic cover if between you and the enemy, the enemy also knows this so watch for mines or ambushes. Another thing to consider is the length of how long you will charge your batteries. Commander Kaj Toft Madsen of the Royal Danish Navy wrote in Fighting the Beast (*Proceedings* August '96) "While on patrol, the commanding officer of a conventional submarine always must be thinking of the battery and the amount of energy remaining. In the patrol area, speed seldom will exceed five knots, to limit energy consumption and radiated noise. Reluctant to operate with low battery, a submarine's CO will take any opportunity to snorkel. It is better to do many, short snorkelings than a few longer ones. Following this policy, the submarine will never be caught low in stored energy, lacking the ability to either to evade or to attack."

Arctic Operations or how I joined the North Pacific Yacht Club

Since most Russian submarine bases are near the Arctic Circle or in regions with seasonal freezes (like the Baltic) you maybe around ice and bad weather a lot.

One thing to know is that hitting icebergs at very low speeds doesn't always cause damage, at around 0-2 knots the Kilo will just bounce off. Also remember that wave action can affect you even if the boat is surfaced though an ice sheet. Now operating in the marginal ice zones means that the ability to snorkel isn't a keystroke or two away. To snorkel you will need to find a polinya (one of those lakes in the ice). If you just need to check the communication traffic for some Link 11 data you don't need to surface the floating wire antenna works normally under the ice. Now you can find where there are gaps in the ice by pressing Shift+I on the nav map twice, the areas where the nav map now shows there is no ice might have thin ice so you can either check the 3D view when you arrive at the area or if you are a purest you can come to a depth of 25 meters and raise the scope for a look at the surface since the Kilo lacks the under ice TV of the SSNs. Should you not wish to use the Shift+I filter just monitor you High Frequency Sonar for areas devoid of large ice flows that show up on your sonar. If the HFS shows nothing but black it's a good place to look for a polinya. Remember to surface the sail out of the ice not just raise the snorkel mast because if there is a thin layer of ice the mast will break and you will be unable to recharge your batteries. Now in your polinya you may find very bad weather conditions, best thing to do is go all stop and try to ride out the waves while you charge your batteries this gives the added bonus of not having to sail around in circles to avoid running in to ice and not exceeding10 knots when you get dunked back down. If your keel dips below 17 meters even if your snorkel is clear above water the mast will automatically lower. The first second your keel rises above 17 meters raise the mast again and try to get as much charging done as possible before you dip down again. If you have to pick up some speed to cut though the waves then go back to all stop. (For added effect every time the snorkel abruptly retracts stick you head in a vacuum cleaner for a few seconds, this is what's going on to your digital crew every time that happens since the diesels take a second or two to shut down and they suck up some of the air in the boat.) Repeat until you have sufficient battery charge to continue with your mission, its long, tedious, and frustrating work and you will soon understand why US SSG crewmembers after patrols off Kamchatka wore NPYC badges emblazoned with Semaphore Flags of 'S', 'M' and 'F' for $h!t, Man, F**k.

Multiplayer and Multistation

One of the most fun things included in DW is the multiplayer capability. Human players are so much more challenging then AI opponents. Now multiplayer games can go two ways; be a totally mess because of uncooperative players or be a well-oiled machine because of team effort. I don't know about you but I prefer the latter.

Interfleet communications with the chatbox

Well of course you know that 'A' sends message to **a**ll, 'D' sends message to si**d**e, and 'T' sends message to **t**eam. But just how to use messages to side effectively? Now the Bluebook has a chapter devoted to proper radio usage, however in just about every MP game I've played I've never seen what was written there actually used! A

few guidelines I use are to have the MP chat filter for the history window selected at all times unless there is a radio message or crew report I need to check. If I'm talking to the crew of a ship who are unfamiliar to me I will address them by their ship type (ex: "Kilo 638 to FFG, be advised I maybe in your active sonar range." or "FFG to Kilo 638 do you hold detection on the convoy?"). This removes the need of going to the mission status screen and looking up the players names, and makes the messages much shorter since all playable names have abbreviations well known to players (incase you *didn't* know them, Seawolf: SW, Los Angeles: 688, Perry: FFG or Fig, Seahawk: Helo, Orion: P3, Akula: AK, Kilo… well 'Kilo' since its name is already short.) If you play with a select group of players this probably won't be a problem but if you either play infrequently or play on an open server like hyperlobby you may encounter people you've never met before.

Intership communications with the chatbox

A platform commanded by several players is a very deadly platform indeed. But how to do it well? Have a clear chain of command. Decide before hand who will be the CO, the CO doesn't necessarily need to have the ship control station (in fact its very cool when (s)he doesn't). Generally I consider the player with the Periscope as the CO unless otherwise decided by the players. The CO should inform all the players what (s)he is intending or what the general plan is. Not only is this informative for the other players it helps promote a team spirit on your boat You can sound like a real cool dude doing this too, saying, "this will be a shooting observation" when making your last periscope view of the target before firing a weapon lets everyone know exactly what is going on and what they should be doing (The TMA player-"Plot" should be ready to make their final corrections to the solution and Weaps should be ready to set the final RTE for the weapon.) Plot and Weaps should report ready ("Solution Set", "Weapons Ready") then the CO should grant Weaps permission to fire ("Fire"… duh). Telling Weaps the firing order ("The firing order will be tubes 1, 3, 5") or just the type and number of weapons to be fired can be helpful as well. Players should also be assertive (while being polite at the same time) with recommendations related to their jobs on the boat. If you are the Plot officer and want to make a course change for the next TMA leg say "Recommend we come to course 235 for next TMA leg" or if you are the sonarman "Contact S04 in sonar baffles recommend course change 15 to port". If you have a problem or need don't expect the other players to read your mind, let it be known what you need. For the Plot officer make sure to keep your CO happy and update the solution on what you are tracking every time a new LOB is generated if possible, the CO can get anxious if (s)he sees the solution for a nearby enemy fast attack hasn't been updated for the past four minutes. As the Sonar operator you should inform the plot on which contacts should be merged if you have several contacts that are in close quarters or in one general direction (ex: Plot merge contacts S01+S03, S02+S04.) Put the list of contacts to be merged at the end of your message so they can see it without having to expand the message history, also other players should try to refrain from posting new messages until Plot reports they have been merged out of courtesy.

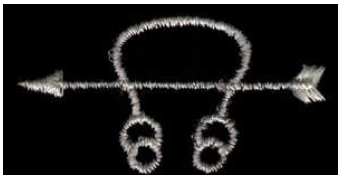
Multistation and maximizing search capabilities
Operating at Periscope Depth requires as many sensors as possible to be utilized simultaneously, having the sensor stations manned with this in mind can make your localizing efforts trim and efficient. Having different players operate the ESM/Radio and Periscope stations is very important. At PD with masts extended the sonar starts to be washed out by ownship noise, having both the ESM and Periscope searching at the same time doubles your detection capabilities and minimizes your time exposed. Also important is your crew's "Air Defense Stations" if you are engaged or about to be engaged by enemy ASW aircraft locating the hostile aircraft rapidly is an important and difficult task. In this case having the ESM/Radio, Periscope and Sail/SAM all manned by different players is important. If no other player available for Radar (having 4 players on a sub is not unheard of but can be difficult to find at times) having the ESM operator double as Radar operator works good too since attacking player aircraft will most likely be under EMCON. Having both the Sail and Periscope operators search in opposite directions (Clockwise vs. Counterclockwise) allows for the maximum chance of spotting enemy aircraft. Once the target is spotted by one of the sensor operators they should inform the other players of its locations simply and clearly, "(Threat) <Bearing> <Close/Medium/Long> (range)".

The Sensor Package

SONAR:

The Kilo's hull mounted conformal MGK-400 sonar has a frequency range of 100 khz to 600 khz and washes out at 8 knots. It has a 65 degree baffled area fore and aft. The Bow mounted cylindrical MGK-400 sonar has a frequency range of 800 khz to 2000 khz and washes out at 15 knots. It has a 120 degree baffled area aft and is capable of both active and passive detection. Some differences you will notice is that the Broadband sonar has no Signal to Noise ration read out and no Tracker Review. These things are up to the operator to do manually. Also the Kilo can only track two targets automatically, but pressing mark on a contact all ready marked but not tagged to a tracker will send another bearing line to the TMA station if it's been several minutes since it was marked. You can do that to lower priority contacts like fishing trawlers, biologics and other noncombatants. The HFS can only mark three or four icebergs, you must delete the old marks before it will display new ones. I select the old ones, press enter to add a manual mark and then delete them. There seems to be no limit on marking mines and other objects.

Using the SSAZ and FRAZ Sonar Displays



One of the most frequent complaints about the Kilo and Akula is the circular sonar displays. Some complaints are valid most others are baseless. Despite the bad comments the Russian sonar systems are very user intuitive and in

some cases better than their US counterparts. The Broadband Sonar screen is called a SSAZ display for **S**ignal **S**trength versus **AZ**imuth. The Narrowband Sonar screen is called a FRAZ display for **FR**equency versus **AZ**imuth. The SSAZ and FRAZ provide a real time top down look at the data gathered by your passive sonar sets. The top down nature of the screens lets the operator know quickly the bearing to the target and the overall sonar picture. The only drawback is that it lacks the time averaging ("history") ability of the US Sonar sets. Just as with the US Sets the narrowband display is the best for first detection and the Russian FRAZ gives the operator data on all bearings within the sensors envelope with the minimum of operator interaction (IE the operator only needs to change arrays and look at the screen while searching). When searching with the FRAZ I find its best to put the selection overlay (the pie slice shaped thing used for classification) on the reciprocal bearing of my course, this has the advantage of no only moving the selection overlay out of the way so it can't obscure any tonals (the cool guy way of calling the frequency lines of a contact on Narrowband) and it points towards your course for easy reference. Also remember that DEMON data can *only* be gathered from a tracker assigned on SSAZ from the Cylindrical Array Sonar.

Electronic Warfare:

The MRM-25EM and 6701E ESM system functions much like the other submarine ESM systems. With the first sweep marked the class is reported on the nav map (unless the emitter is distant then only the type is reported) and will be displayed on the ESM station with the next sweep. The only difference between this and other sub ESM systems is that it doesn't report the bearing to the emitter; it's up to the operator to determine bearing based on the 360-degree EW display or to look it up on the TMA or Nav Map screens. You will find that the ESM system to be very handy on the Kilo since its sonar system lacks a powerful Towed Array making long range classifications difficult, generally the ESM has about the same range as the sonar does on warships moving at medium speed when the mast is used at shallow depth.

Periscope and Standimeter:

The Periscope has been used aboard submarines almost since the beginning (Simon Lake founder of the Lake Torpedo Boat Company patented the Rotating, Retractable Periscope in 19--). To go back to Admiral Holland's writings in *Proceedings* "… the periscope is valuable beyond all comprehension of a non-submariner. It is the only unambiguous sensor available to the submariner; but it is also a source of unambiguous detection for surface and air submarine hunters." SCS has not as yet incorporated radar detection of the Periscope in DW but a sub at Periscope Depth can be spotted by the P-3's IR camera. Also of note the Periscope ESM only warns that Radar emissions are detected unlike the other submarines it doesn't give signal strength as a read out, the volume and length of the tone is the only clue and the Kilo has no LLTV making the use of the scope at night or in low visibility problematic.

Old School Firing Solutions

The Kilo Standimeter functions differently than the other sub's, it doesn't give you the target's course automatically once you select the angle on the bow of the target. You must do this your self. A simple $1 calculator is handy for this (unless you are good at math which I am not). If the targets bearing is 000 to 180 add 180, if the targets bearing is 180 to 360 subtracted 180 then if the AOB is to starboard subtract the AOB, if the AOB is to Port add the AOB. Right there you now have the bearing, range and course of the contact for your TMA, and experienced skipper can even judge the speed of the contact by its bow wave (This is why ships in WWII occasionally had fake bow waves painted on). Consult Appendix D for more bow wave info. Another important thing is proper standimeter operation, first place the horizontal crosshair of the scope on the waterline then in the standimeter move the tallest piece of structure of the ship (besides the rotating radars) to the waterline for an accurate range measurement. In two minutes (assuming the target doesn't move radically) a pair of periscope observations can give you a "shootable" solution, compare that to the 10s of minutes to a half an hour to get a good passive sonar solution.

Weapons

The Kilo arguably has the worst weapons package of any playable submarine in DW. All their torpedoes have about half the range of their nuc counterparts. However your detection range in much less than a nuclear submarine's so these short ranged weapons are not the great handicap as they might appear. The Kilo has six torpedo tubes; tubes 1-4 are loaded from the "Main Rack" while the two wire guide capable tubes

(5-6) are loaded from their respective racks. Most important, never ever load TEST-71 torpedoes in the Main Rack; they are unusable from there- SCS made a mistake in allowing them to be loaded there. Torpedoes can only be fired at a depth of 240 meters or less.

"The only time you know when a submarine is around in a time of war is when a torpedo warhead goes off" -Tom Clancy

Direct Hit! Sending the enemy to the bottom

Just how to attack a group of enemy ships? Well a good Kilo attack comes in stages; the first weapons to be fired should be the 53-65K Wakehoming torpedoes. These are the fastest torpedoes available for the Kilo. Since your first attack has probably sent ships scattering in all directions and hopefully sank a few there are some wakes out there that can confuse a 53-65K torpedo. One of the most frustrating things is when a wakehomer starts to follow the wake of a ship that already been sunk. Wakes can stick around for a while, they extend far beyond the bubbles and foam you see behind the ship. Also remember that OTS countermeasures can occasionally sucker in a wakehomer and leave it circling it and if fired from abeam of the target the wakehomer will have a hard time hitting the target because it can't turn sharply. The second weapons to be fired should be the USET-80s or Yu-8s torpedoes since these torpedoes will not be fooled by the confusing wakes of the enemy ships. Remember that now there maybe a lot of decoys in the water unless you are fighting American or NATO ships (I will list which ships use OTS decoys latter in this document) so set your Acoustic torpedoes to enable past where decoys are likely to be (such as where the enemy ships began their evasive maneuvers.)

Making the Attack

Since the Kilo's Sonar is limited to two trackers attacking more than one or two ships is difficult unless they are using active sonar (since pings are tracked independent of the sonar trackers.) Knowing how to attack ships from periscope depth is essential. With the Periscope you can rapidly get solutions on several ships. One quick trick is to use the Course and Range of one ship for others steaming near it. Depending on what angle you are attacking from add an arbitrary number of meters to the solution for each subsequent ship in the group. If you have the time and are attacking from ahead get the range of the first and last ship in a column and enable the torpedoes in your salvo before the first ship, behind the first ship and before the last ship. That way you are attacking both the ship closest to you and the other ships in the column with the minimum of work. Attacking from the side of a column of ships is best done with wakehoming torpedoes since you are aiming at a much larger target (the ship and its wake, not just the ship its self). Firing from ahead with wakehoming torpedoes makes for a very hard shot since you are targeting the smallest possible area.

The Klub missile system

There is one playable Kilo capable of carrying the Klub series of missiles, Chinese Kilo Hull 368. The Klub missile system consists of an Anti-Ship missile (3M-54E), a Land Attack missile (3M-14E), and an Anti-Submarine missile (91RE1). The land attack missile is very straightforward, place the final waypoint on the target and the others to avoid enemy SAM defenses. The missile's range is 161 nms. The ASW missile deploys an MPT-1UE torpedo (range 13 km, speed 45 knots, warhead 150 kg, and seeker range 2,000 m) and has a range of 27 nms, this is arguably the best SUBROC available in DW. The ASM is one of the most deadly weapons in DW, it is a two-stage cruise missile with the 2nd stage supersonic at mach 2.5 with of range of 13 nm and a warhead of 200 kg, and the cruise stage has a range of 108nm and a speed of 500 knots. All Klub missiles must be launched from a depth of 50 meters or less and at a speed of 6 knots or less.

The SS-N-15 Starfish

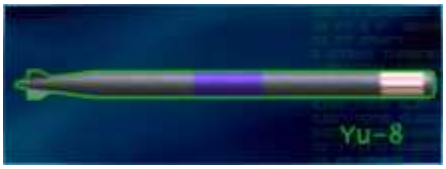
"Who ever invented the rocket delivered torpedo should have gotten a medal."
- Master Chief Jollen, *Silent Steel*

The SS-N-15 Starfish anti-submarine rocket has a 19 nm range and deploys a UMGT-1 torpedo (also called the AT-3 when used for aircraft deployment). The UMGT-1 has a speed of 41 knots and a range of 4.3 nm, a warhead of 120 kg and a seeker range of 1,500 m. The N-15 has a funny launch envelope you must be between 50 and 150 meters and at a speed of 6 knots or less to deploy the weapon. As you probably already know using a SUBROC requires a very accurate solution to score a hit. Being skilled at TMA becomes very important here, read the target_motion_analysis.pdf including with the SCHQ TACMAN and the TMA Tutorial video that came with DW. Sometimes using the active sonar can be the most expedient way of getting the target range for a SUBROC launch, although it can be dangerous on a distant contact- you don't always get a bright return on the display. If you have been fired on going active and firing a pair of SUBROCs is a great way of leveling the playing field. The minimum depth at target area is 90 meters for both N-15 and N-27 SUBROCs.

Kilo Torpedo Armament

USET-80
Type: Multipurpose Torpedo
Found on: Russian Kilos
Speed: 50 knots
Range: 10.7 nm
Warhead: 300 kg
Active/Passive Homing
Notes: Best torpedo loaded on the Kilo but lacks the wire guidance of the TEST-71 torpedoes. High speed means you can hit more distant targets and large warhead means you can use on more than just submarines effectively. Max depth is 500m. USET-80

stands for [Universal] samonavodiashaiasia elektricheskaia torpeda; Universal Homing Electric Torpedo 1980 model.



Yu-8 [Formerly SET-53ME]
Type: Multipurpose Torpedo
Found on: Chinese Kilos
Speed: 45 knots
Range: 10.39 nm
Warhead: 300 kg
Active/Passive Homing
Notes: Chinese copy of USET-80. Max depth is 434m.

TEST-71M Type: ASW Wire Guided Torpedo
Found on: Russian Kilos (-17ME export version found on Chinese project 877 Kilos)
Speed: 40 knots
Range: 10.8 nm
Warhead: 205 kg
Active/Passive Homing
Notes: Unable to target a surface ship but will home in on one. Max depth is 399m for all TEST-71 series torpedoes. TEST-71 stands for [?] elektricheskaia samonavodiashaiasia torpeda; Electric Homing Torpedo 1971 Model Wire Guided Torpedo.

TEST-71ME-NK
Type: Multipurpose Wire Guided Torpedo
Found on: Chinese Kilo Improved
Speed: 40 knots
Range: 10.8 nm
Warhead: 205 kg
Active/Passive and Wake Homing
Notes: Improved version of above torpedo uses wakehoming doctrine so once it has acquired a target it can't be redirected only shut down. Due to that I find these are more trouble then they are worth, I only load them on the *368* boat since they are the only anti-sub capable torpedo that is in her inventory.

53-65K
Type: Wake Homing Torpedo
Found on: Russian Kilos (KE export version found on Chinese project Kilos)
Speed: 55 knots
Range: 10.25 nm
Warhead: 300 kg
Wake Homing
Notes: Your primary anti-ship torpedo. Can be

decoyed by OTS decoys and will not acquire a slow moving target. Propelled by a Kerosene-Oxygen Turbine. 53-65K Stands for 53cm 1965 model wakehoming torpedo.

Mobile Mine (AKA SMDM; Self-Moving Sea Mine)
Type: Bottom Mine
Found on: All Kilos
Speed: 26 knots
Range: 10 nm*
Warhead: 450 kg
Two Channel (Acoustic-Magnetic Induction) Fuse
Notes: Built from the engines of the 53-65K with a much larger warhead. Effective depths range from 4 to 150 m. Must be launched in water 150 m deep or less under LWAMI. *There is a bug currently where all mines have unlimited range.

Kilo SAM Armament

SA-N-5 Grail (Strela-2)
Type: IR Guided Surface to Air Missile
Found on: Chinese Kilos
Speed: 972 knots
Range: 2.4 nm
Warhead: 1.15 kg (61 kg In game)
Max Altitude: 7,800 feet

SA-N-8 Gremlin (Strela-3)
Type: IR Guided Surface to Air Missile
Found on: Russian Kilos and Chinese Kilo Improved
Speed: 972 knots
Range: 2.5 nm
Warhead: 1.15 kg (61 kg In game)
Max Altitude: 11,500 feet

Group Tactics

The Wolfpack, almost nothing is more feared. Several submarines operating together provide mutual support and can attack an enemy from several axis complicating his ASW defenses. Today group tactics go beyond several like subs operating together, your Kilo maybe tasked to work with a nuclear sub or even a group of surface ships or ASW aircraft.

Cooperating with other diesels

The only thing worse than one Kilo is two Kilos. Since the Kilo has such a limited sensor range compared to the SSNs in DW having two Kilos operating about 15-20 nms from each other can form an effective barrier against an enemy force. Two Kilos can provide mutual support during a transit, while one Kilo can charge diesels while the other watches for trouble in a modified Bounding Overwatch (see Bluebook for description). Two Kilos operating along one LOB alternating charging batteries may confuse an enemy and could help draw enemy forces off a Kilo low on batteries. Also two Kilos can use their EW systems to pinpoint an enemy warship by using a LOB from both Kilos.

Cooperating with nuclear subs

Just as you may have to cooperate with other Kilos, operating with nuc submarines is also a possibility. Operating with nuc boats can take many forms from defending SSBNs to operating with SSNs and SSGNs attacking a carrier group.

Defending a Boomer

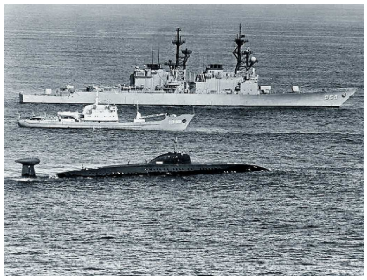
Ballistic Missile Submarines are always targets for enemy ASW forces. Current Russian doctrine is to defend them heavily close to port or under the ice pack. Your Kilo maybe tasked with defending a Boomer from enemy submarines at one point. Since the Kilo is so stealthy it can lie in wait for a sprinting Hunter Killer submarine. Generally the precise location of the Boomer is not known to the enemy forces requiring them to search a large area. In this case you can pick the area to wait for the enemy in. Look for Biologics or surface traffic to put between you and the enemy's likely route to your area. Find a noisy area to duck in to if the enemy gets the jump on you.

Operating with a Fast Attack

For those not familiar with the origin of the American DBF (Diesel Boats Forever) pin the story is that a crewmember off a *Barbel* Class Diesel Submarine in Japan took the design to a local merchant after his boat got back from taking over a patrol from a US Nuclear submarine that had to return to port early. The pin was meant to resemble a WWII combat patrol pin except each gold star was for when a

Diesel relieved a Nuc. The local merchant kept the design of the pin and begins to sell it, the original purpose soon forgotten. Today both Nucs and Diesels are fairly reliable (at least in the realm of DW) and you maybe required to operate with a nuclear attack submarine at some point. Having a nuclear boat with you gives you added protection from enemy hunter killer submarines. Generally the nuclear submarine will be more detectable than your Kilo requiring them to stay farther away from enemy ASW forces. This means that you may have to act as a scout and get close to the enemy forces and link the targeting data to the nuclear submarine. Sometimes remaining undetected and not attacking can cause more damage to the enemy than attacking alone. By getting close to an enemy battle group you can also "pick off" enemy air defense ships while the nuc launches an anti-ship missile attack against the valuable ships in the battle group.

Operating with surface ships

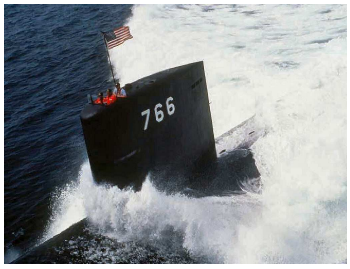


The Kilo is not the best type of submarine to operate as an escort for surface ships. But operating with a surface group gives the Kilo some advantages; first you get cover from SAM capable ships and occasionally fighter aircraft on CAP. The Kilo is best operating at a distance from a surface group providing warning of threats and the surface/subsurface picture of the ocean along the group's PIM since a Kilo doesn't have the endurance to operate along side a fast moving surface group for long. An advance force of several Kilos 30-40 nms ahead of the fleet can be effective as scouts should the force not have helos or fixed wing aircraft available for that job. If chopped to a slower moving convoy a Kilo can screen them by taking up station about 7-8 nms off its beam or in front of it so you are located right where another sub must be to fire torpedoes at the convoy, if the attackers are SSNs with heavyweight torpedoes take up station about 13-14 nms away from the convoy.

Operating with ASW aircraft

Operating with an ASW aircraft poses a challenge to a submarine. Their partner's job is to hunt down and kill units like them. Coordination is essential to avoid friendly fire, frequent radio contact and prescribed weapons hold zones are required. Having a submarine and ASW aircraft operating together have several advantages. Most P-3 and Seahawk drivers only carry a single BT buoy thinking that the thermocline layer is basically the same across their search area but this isn't always true some areas the layer changes depth or vanishes. A submarine has a continuous supply of BT data. Also a submarine has the ability to hear the broadband sounds of a contact, which a P-3 lacks and a Seahawk can only do with its dipping sonar. Biologics can occasionally confuse a P-3 driver using active buoys to search for a contact; a submarine can point out where the biologics are to the P-3. The ASW aircraft's radar also gives an advantage to the submarine. By knowing the location of all surface ships they can quickly find a LOB to a target with no corresponding surface contact. This contact has a high probably of being a submarine. One thing to do with an airborne buddy is to set up a

‘Moving Haven’ 10 miles wide by about 50 or so miles long where your sub can operate but the airborne units can’t attack a submarine contact.



Help there is an enemy nuclear submarine after me!
Having to fight an enemy SSN is something that a Kilo Skipper will occasionally have to do. In this case the Kilo stops being a hunter and becomes the hunted (remember the Tag Line of *Das Boot*?) An SSN has a tremendous advantage over the Kilo, it’s the same advantage all nuclear submarines have had over diesels since the days of *Nautilus*, *Dreadnought* and *K-8*, they can dive deeper, stay down longer, and go faster than you. But all is not lost. If you know the submarine out there is looking for you make it as difficult as possible for him to find you, find a nice spot under the layer and go slow and quiet and wait the SSN out or wait for him to wander in to torpedo range and attack from very close range (its possible to close within a few miles of an enemy SSN and still be undetected). Remember the story about the Australian Collins class submarine that “sank” a bunch US SSNs and a US Carrier in a war game out in the western Pacific a few years ago? A diesel on familiar ground can be a great trap for a SSN. If firing from close range fire from behind the SSN, this isn’t because behind a submarine is its sonar baffles (SSN’s tend to have Towed Arrays, removing the baffles for the most part) this is because the enemy torpedoes must turn to go after you. A torpedo that must turn is an imprecise torpedo. What if they counterfire at close range? Well its Red October time, increase speed to flank and turn in to the torpedo. At such close range an SSN driver probably wouldn’t use a torpedo set to circle lest they suffer the same fate as old Captain Tupolev. If you attacked from close range from behind decreasing the distance can result in you no longer being in the weapon’s seeker cone. What if the SSN goes active beyond my torpedo range you say? This is why your Kilo has N-15 Starfish, and N-27 SUBROCs. When you hear that ping you have a choice, hide or go for a solution. To hide turn directly towards the pinger and move to the opposite side of the layer. To get a solution on the pinger increase speed and go on a course 90 degrees off the bearing of the ping and wait for a second ping. Where the LOB cross you have a rough location for a snapshot SUBROC launch. You can also use the bearing of the TIWs in place of the second ping- mark the torpedo and use manual TMA to select both pinger and torpedo (use the ‘merged track’ drop down list but don’t actually merge them) then move the speed strip to where the LOBs cross.

How do I hunt an enemy diesel submarine?

Two conventional submarines hunting each other can be a long drawn out game of mouse and mouse (as opposed to a game of cat and mouse). Generally your Kilo will be evenly matched with a diesel opponent in terms of weapons although some diesel submarines are armed heavyweight torpedoes such as the Mk 48 ADCAP. Your Kilo has one advantage over another diesel your SUBROCs. A SUBROC is a hard weapon to dodge in a nuclear submarine, and is deadly to a diesel. Sometimes a diesel vs. diesel fight may just end up being a contest of who can hold their breath the longest (meaning who can stay dived the longest). The Kilo can stay on batteries at 3 knots for 5 and ½ days before needing to recharge them (and 10.8 days before the air needs to be refreshed but that is not simulated in DW) use this to your advantage and wait for the other diesel to be forced to snorkel to charge its batteries and sent them a SUBROC after making a couple of high speed TMA legs (remember a sub snorkeling will have its Sonar partially washed out). However in MP this isn't feasible because most players can't sit around and play for that long. In that case setting up an ambush if you are playing defensively would be your best bet. Find an area they are likely to pass through and stake it out. Think about what weapons to use and where to escape too once you make detection. A fight against another diesel will probably end up resembling a Hollywood submarine movie style knife fight at close range with many spreads of torpedoes exchanged. Most importantly many diesels in DW do not have towed arrays so the old trick of hiding in their baffles and firing a torpedo at close range can be very deadly. Which diesel submarines in DW carry equipment that is better than yours? See 'Appendix C: Your counterparts' a listing of other Diesel Submarines in DW.

Torpedoes on a Russian Submarine, SUBROCs are on the lower left and upper right.

Help I'm being engaged by enemy ASW forces!
Destroyers, Frigates, Hunter Killer Submarines, Helicopters, Fixedwing Aircraft both land and carrier based, all these maybe employed to hunt you down.

Enemy ASW Search Tactics
Remember that scene from *The Hunt for Red October* where Jack Ryan and the Captain of the USS *Enterprise* are talking in the CIC about the Russian fleet and submarine movements?

Captain*: *Russian submarines have taken up position off every east coast port…aside from about a 100 more Bear Foxtrots they have a line of attack subs here followed by several surface groups… There's something else strange their banging away with their active sonar like their looking for something but no ones listening… their moving at close to 28 knots at that speed they could run over my daughter's stereo and not hear it.
Ryan: Their not trying to find Ramius they're trying to drive him.
Captain: Drive him where?
Ryan (Noting Russian subs of the US Coast): Hounds to the hunters.

Remember enemy ASW forces are always looking for you.

Unlike on a Submarine when a surface ship uses its active sonar it's not always trying to get a firing solution on you. Their pinging is meant to keep you as far away from them as possible. By giving away their position they force you to either move away from them where an enemy hunter killer submarine or ASW aircraft maybe waiting or force you to attack them- in the case of the latter Peter A. Huchthausen in *October Fury* writes: " …as the saying went in wartime, the destroyers could fulfill their mission by marking the submarine's last position with their own flaming oil slick as they went to the bottom." Generally sinking enemy ASW vessels while fun is not the mission of the Kilo or any submarine for that matter, sinking the Carriers and Merchantmen they protect is (unless your trying to get a reputation as a Destroyer killer like Capt. Red Ramage). So what to do? If possible move around the enemy ASW screen and attack from the side, generally an enemy battle group or convoy will be moving at a speed higher than your Kilo can move at for very long so this is seldom the case. Finding the shadow zone of the enemy's sonar is critical here, according to FAS the "best depth" to evade is 17 divided by Layer Depth if LD less than 60 Meters. If the LD is greater than 60 Meters the BD is LD + 60 Meters. Remember if you can't hear the ping odds are it can't see you. A submarine in the shadow zone of an enemy ship's Active Sonar can't be detected and you can slip right under that screening vessel, however lots of ASW ships have either a Towed Array or Variable Depth Sonar than can get under the layer and detect you. In those cases slow speed is preferable but be warned some Towed Arrays have an active search capability, learn which ships have them and avoid them. Some French build ships have Active TAs and Small Russian built patrol craft (nether of which of which are currently in DW) have dipping sonar from a helicopter, both of which maybe able to ping below the layer.

Fixed Wing ASW

Aside from blimps Fixed Wing ASW Aircraft and Maritime Patrol Aircraft (MPAs) are the oldest type of ASW aircraft. They combined high speed, long endurance and a big payload in to one mean package. They can be based from shore bases as is the case with ones like the P-3C Orion or Il-38 May or be based from an aircraft carrier as is the case with the S-3B Viking or older S-2 Tracker. The MPA is great at searching hundreds of miles of liquid real estate but when it comes down to localizing a detected submarine it falls short. Its only ways of getting a precise fix on a sub are with its MAD detector which means it must fly low to search as deep as possible or with active sonobuoys which give the enemy sub warning that an attack maybe coming soon and maybe give him adequate time to get ready with his MANPAD SAMs for a last ditch defense. In DW sonobuoys have a life span of only 2 hours, which means that if your Kilo successfully hid in an area already searched by sonobuoys the MPA driver must either decide that the area is clear, or search it again expending more sonobuoys. Commander Kaj Toft Madsen writes “One of the best ways for the submarine to get away is to go for swept water, where the ASW force will have a tendency not to look.” Another good place to hide from an MPA is in shallow water, since an MPA flies faster and higher than a helo its torpedoes dive deeper upon entry, if the water is shallow enough they end up in the mud.

Rotary ASW

The most capable platform for localizing a submarine is the Helicopter; its ability to hover and deploy both sonobuoys and variable depth sonar allows it to get the best “fix” on you. However this ability comes at a cost, the Helo is very vulnerable; it must fly low for maximum speed, it’s slow, and has limited range. These are things you can use against them. One technique common in MP is to wait for them to come in low for a MAD hit and pop off a MANPAD SAM at them. Of course good helo pilots keep a Torpedo ready to drop at all times or have a Penguin missile ready to fire. Another seldom-used technique in MP is to wait them out, as with the P-3 you can stay submerged longer than they can stay airborne. This is seldom used in MP due to time constraints (especially against the P-3 with its 14 hour fuel supply). Generally waiting a helo out may result in a mission failure (in this case the enemy has scored a ‘soft kill’ on you) but you are still around to trouble them again and the forces they’ve sent after you may not be able to harass other friendly submarines you maybe working with.

Look there’s that annoying Kilo driver at periscope depth! Lets drop a MK 46 on his aft deck…

Torpedoes from surface ships

US built and armed surface ships are at a disadvantage against you, their torpedoes have a maximum range of only 7-8 nms, the Kilo's torpedoes have a max range of just over 10 nms. Its possible to move in to optimum shooting and clear out of max range of the enemy's torpedoes (or at least make is so that if you spoof the enemy torpedoes once they will run out of fuel before they can re-attack you), the "sweet spot" is about 5 nms from the target. At that range they can't simply turn tail and out run your torpedoes unless they are a high-speed patrol craft or fast destroyer (like a Kashin). Russian built warships present a problem; the Russians arm their ships with 533mm torpedo tubes with the same types of weapons as you carry. Going up against a Russian built warship puts you at an disadvantage, you can't simply clear out of the weapon's max range (unless it's a SET-65 torpedo that Neustrashimy, Krivak, and Indian Kashin class ships use) you evasion will boil down to use of countermeasures and maneuvering.

Torpedoes from aircraft

Torpedoes from aircraft can be very inaccurate or accurate beyond belief. Prevention is the key here. By avoiding detection you avoid being attacked. As discussed before operating in shallow water can help defeat air dropped torpedoes. Also watch your baffles, one common and effective tactic is to deliver a torpedo in a Kilo's baffles giving them almost no warning. Generally most pilots in MP will keep their distance from a submarine they fear MANPADs so much, they will even operate under EMCON to avoid detection by ESM. This can make taking a MANPAD shot difficult for you but it also removes an important sensor from the aircraft's inventory. By making sure another player knows you will take a MANPAD shot at them the super accurate torpedo drops in your baffles become more difficult.

Anti-Submarine Rockets

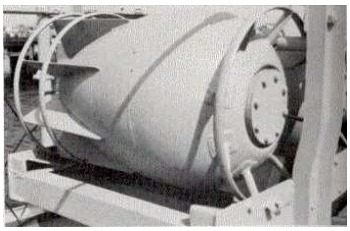
What about those ASROC armed ships? ASROCs pose a problem to all submarines nuclear and conventional alike. The US ASROC has a max range of nearly 5 nms (9,260 yards to be specific)- right in the "sweet spot" I mentioned earlier. These can put a Mk-46 torpedo right in your neighborhood very fast, once while making a periscope depth attack against a Ticonderoga class Cruiser I saw one of these arc up in to the sky as I stared dumbly trying to figure out what it was (I thought it was a SAM) until it splashed in to the water two miles behind me and its payload began its active search. Best thing to do is to clear 1 mile from datum away from the ship when you make your attack. If the target got very little warning of attack and if you placed a preemptive

countermeasure in the right spot their counterattack may not hit you. I refer you to the TACMAN for more anti-ASROC tactics.

Types of ASROCs

RUR-5A ASROC
Fired from the "Pepper Box", Twin Arm and VLS launchers on many US and US-Allied Warships, the ASROC is designed not necessarily to sink a submarine but to keep it at arms length until a helo or aircraft can deal with it. These drop an Mk 46 "Neartip" torpedo in to the water. Unlike the SS-N-14s discussed below the non-VLS launchers can be reloaded on some ships.

SS-N-14 Silex
The Russian answer to the ASROC, like most things in the Russian military they are big and powerful. Basically a N-2 Styx missile with a torpedo hung off it the N-14 has a tremendous range of 27 Miles giving Udaloy and Kara class ships incredible onboard ASW reach (out to around the 1st convergence zone). IRL they can even be used as an Anti-Ship weapon with the torpedo replaced with a warhead. At one point the Kirov class CGNs had a twin reloadable launcher for these but they have been removed.



Depth Charges
The most primitive ASW weapon available the depth charge is still used by some modern ships, mostly those of Eastern Navies. In DW depth charges are thrown in front of a ship where they sink down slowly until detonation. These weapons are only effective against shallow submarines for the most part. Even the Kilo can evade a depth charge attack by going deep. Also Russian built ASW aircraft may employ depth bombs against you. These tend to be dropped in train (an aviation term meaning dropped one after another) across your supposed location causing several sonar reports of explosions. Like the surface launched depth charges going deep tends to work in avoiding being hit.

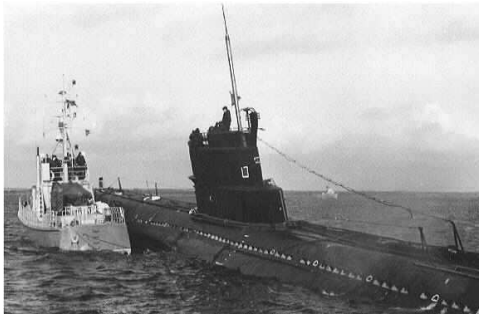
Special Operations

Spec Ops near the enemy's coast is one of missions the Kilo is most effective at. Spec Ops goes beyond just delivering and retrieving Special Operating Forces in to hostile territory, mission objectives may include conducting reconnaissance of an enemy coast line or landing zones, gathering Electronic Intelligence of enemy forces, and monitoring enemy movements (i.e. counting enemy ships leaving port or watching for aircraft leaving enemy airbases.). Operating close to shore presents a whole host of problems for a submarine, detection ranges are shorter than in the open ocean leaving you little warning of a closing hostile patrol craft. There are many areas two shallow to operate. Deep draft ships may cross your position risking a collision. Recon of enemy locations on shore can pose a problem, its difficult to get a good solution on a target on shore since only one or two sensors are available for TMA, ESM and the Periscope. Several observations from different locations along a 90-degree curve around the target can give you a very precise location of the target for a future missile strike although the Auto TMA can do a good job with ESM readings you maybe have trouble telling if they are 100% correct with data gathered from one bearing.

Going where nucs fear to tread

Mr. Submarine meet Mr. Seamount, Mr. Seamount meet Mr. Submarine…

There is an Old Russian saying "Keep 7 feet [2 meters] under the keel." As a diesel submarine the Kilo can operate in water too shallow for a nuclear submarine to operate in. Submarines are designed to be free floating and nuclear submarines have intakes for the reactor cooling system on the ventral side of the hull, should they be too close to or resting on the ocean floor they can suck in mud or sand, which can disable a submarine. A diesel submarine doesn't have this limitation. A Kilo can operate in water 15 to 16 meters deep depending on sea state. Be careful when operating in such shallow water and plot out your course carefully and plot out an escape route to deeper water should you come under attack. Always plot out shallow areas with nav marks, put a nav marks with the water depth every mile so that information is available at a glance. Operating in such shallow water may come as an unwelcomed surprise to enemy ASW forces that think that no submarine would/could operate in such shallow water. Always operate with caution in shallow waters or skirting shallow waters otherwise you may end up like the 'Whiskey on the rocks'.



Conn Sonar Crazy Ivan!!

Yep that's right probably the most well known submarine maneuver makes its return with the Kilo. Unlike the other submarines in DW you have no towed array leaving you with the familiar baffles to keep an eye on. Most importantly don't make course corrections on a set schedule, this can be predictable if an enemy predicts your maneuver they can go quiet and evade or take their shot when you are most vulnerable. Remember TMA auto-trackers update at 2-minute intervals, if you are being tracked by an enemy you can time your baffle clearing maneuvers to foul up his TMA by spending at least 2 minutes off your original course or speed.

Someone just dropped 45 cents… Pulling a "Down Periscope"

If you are in deep water (deeper than you can dive) there is a way to evade a player (probably not AI) ASW aircraft's MAD and Active Buoys, that is to pull a "Down Periscope". If you haven't seen that movie a diesel submarine evades enemy ASW forces by hiding under a Super Tanker. Under LWAMI this is possible, at near max depth you are out of range of the P-3's and MH-60's SAD (Submarine Anomaly Detector). Their MAD will still get a hit but if you are directly under a ship they will receive only a single hit. There are a few problems in hiding under a merchant ship, one they maybe going too fast for you to stay under long, two hiding directly under them can put them in your sonar baffles with out them being behind *you*. When I first saw this I thought my sonar was broken but then I realized that DW simulates the sonar's field of view very well, in fact with close aboard contacts each sonar will display a different bearing to the contact. This blind spot in your sonar exists directly above and directly below the center of your ship, it is behind cylindrical sonar and above the conformal sonar. A ship's noise signature is generated from the center of the ship in DW (not necessarily correct IRL) if this spot is behind your cylindrical array and in front or behind your conformal array you will not detect this contact on your passive sonar and the ship could turn leaving you uncovered with out you knowing until its too late. So what to do? Keep HF Sonar trained on the ship and try to keep the ship in one of your passive sonar's field of view, preferably cylindrical for DEMON information in provides.

On the left is a Kilo with the Cargo Ship in its baffles. On the right is a Kilo with the Cargo Ship in its conformal sonar's field of view.

Mine Warfare

People sometimes underestimate these little fellas. The Kilo and Akula's Mobile Mines are one of the most powerful weapons available to players. Its 450 kg warhead can ruin a surface sailors whole day, the tough Oliver Hazard Perry class Frigates can withstand 500 kg worth of damage. Placing mines too close together will cause them to chain-react; also the enemy must sail within 100-150 yards of the mine to trigger it. Putting a few mines in to a channel can slow down a player FFGs. Players will either have to maneuver away from the mines or if they are escorting a group of ships clear the mines with torpedoes. FFG SVTT launchers take 20 minutes to reload a single fish (only one maybe loaded at a time). Forcing the enemy to clear some mines can put a SVTT launcher out of action for a while. The low number of racks on the Kilo makes it difficult to put up a good sized minefield and still have torpedoes left for attacking ships but several Kilos working together can put up a nasty surprise for an enemy surface group. Mines also can occasionally fool a player Seahawk or P-3, the Seahawk or P-3 will see a moving target that reflects sonar and may chase it down and hopefully waste a fish on it. I've seen this work in multiplayer.

When the $#!& hits the fan

So they've deployed everything they have against you

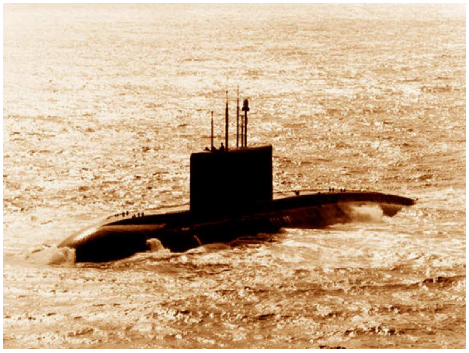
Nuclear tipped ASROC test firing. Be glad you are not on the receiving end of these in DW!

As a Kilo driver you are likely to get fired at with more weapons simply because you lack the speed to get clear of the enemy and your short ranged weapons bring you in to range of weapons a nuc might not encounter. What do you do in this situation? Put that fast reload to work and fire as many weapons at the enemy as possible, sinking a few enemy ships just might tip the balance in to your favor- at least it might get a few enemy warships off your back for a while as they evade your torpedoes. Get the enemy in to a cross fire if you can, players will be forced to hold their fire and AI may cause chaos in a group or ships by having ASW torpedoes go after their own ships and decoys. I once was faced with three enemy SSNs (two Seawolfs and 1 688(i)) all manned by good players and I survived by putting my self between two of them and moving as close to one as possible. By doing that I cut down on the number of weapons they could fire (because they couldn't cut the wires and reload lest they risk friendly fire) and I used the noise of both of our torpedoes to mask my signature.

So you've been "worn out"

You out of weapons, out of countermeasures and the batteries are low what do you do? Surrender is of course one option so is scuttling the ship to rob the enemy of the kill. But if your like me you want to do some damage before you get taken down. Unlike in real life when a ship in DW gets run over by a much larger ship they are not simple cut in two the smaller ship will continue to float there for a while when its destroyed. By putting your Kilo in front of an enemy target and surfacing as close as possible you can take out a valuable target even if your boat is sunk on approach because the other ship will continue to hit your destroyed ship taking damage. When you're in a group of enemy ships when worn out running at 14 meters (depending on sea state) on diesels you can do 10 knots and fire SAMs if necessary at 17 meters you can do 9 knots, its possible to use enemy ships as a countermeasure to decoy torpedoes. This works very well against AI units, human units will coordinate to minimize friendly fire.

Conclusion



Ok just what are the advantages of the Kilo?

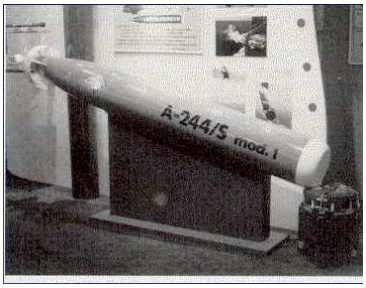
The obvious one is stealth, on batteries at low speed the Kilo is hard to detect. Some of the not so obvious ones are that all its weapon loading systems are automatic, torpedoes and countermeasures take 2 minutes to load or unload compared to 8 minutes on the other subs. One not so obvious advantage is cost. A Kilo costs only around 300,000,000 (300 Million) US Dollars to purchase. At that price it becomes somewhat expendable as long as it fulfills its mission its OK if it doesn't come back. (A very stark way of looking at life but that was very much the Soviet way of doing things.) One joke I heard not long after DW came out is that the Kilo is so stealthy that the only thing that can kill it is a 3 billion dollar *Seawolf* class submarine. In the DW user manual it gives the *Seawolf*'s primary mission as just that. As stated in the beginning of the guide the Kilo's cost is with in range of many militaries around the world. While the Diesel Submarine seems humble compared to the various high tech nuclear submarines and warships available in DW their simplicity, ease of operation and inherent stealthyness makes them a serious threat. Just look to conflicts in the not so recent history, "A small force of Argentine diesel-electric submarines created enormous concern for the British. It dictated, at least as much as did the air threat, the conduct of the British naval operations and caused the expenditure of a vast supply of antisubmarine warfare weapons. Virtually every antisubmarine weapon in the task force was expended on false submarine contacts." ("An Analysis of the Falklands/Malvinas islands Campaign" by Adm. Harry D. Train II, USN, *Naval War College Review*, Vol. 41 winter '88), "A French-built Pakistani *Daphne*-class submarine sank an Indian frigate… Another *Daphne*-class

submarine, operating approximately 3,000 nautical miles from its Karachi base, attacked the Indian Navy aircraft carrier the *Vikrant*. The attack failed, but contrary to Indian reports, the submarine was able to evade the Indian counterattack." (John R. Benedict, "Comment and Discussion," *Proceedings* Oct. '92.) Older low-tech submarines of the underdog navy can even stand up to even the navy of a regional or world power if utilized with skill and professionalism.

Things to remember

Utilizing all ownship sensors is of critical importance. The Kilos sensor range is about half that of the playable nucs so gathering every shred of data on the enemy is important. Learn the sensor and weapons envelopes of the Kilo. Practice Standimeter usage, accurately finding the range and course of a contact via the scope is important on the Kilo since its limitations on long sprints and low sonar wash out speeds prohibit making many high speed TMA legs. Monitor your battery charge and plot every move accordingly, operate near places where you can charge batteries with less risk of detection. Use the mission editor to set up practice heavy seas scenarios so you can learn just how the Kilo will handle in such weather, you can open the mission file in notepad to input sea states higher than 5.

Appendix A
Types of torpedoes used by Surface and Air ASW forces

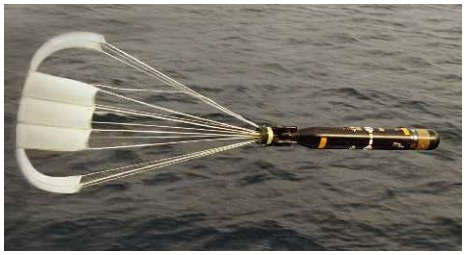


A 244
Found on: Argentine ASW Aircraft and Ships. PRC Helos and Ships (Luhu), Some Indian ships (Delhi, Godavari, Leander), some Sea Kings, and Iranian P-3s
Speed: 30 knots
Range: 3.2 nm
Warhead: 34 kg
Active/Passive Homing
Notes: Probably the worst ASW torpedo in DW next to the seldom seen MK 44. It will take about 4 of these to sink a Kilo.

APR-2E
Found on: Russian built ASW Aircraft
Speed: 55 Knots
Range: 5000 m
Warhead: 150 kg
Active Homing
Notes: Powered by a rocket engine spinning a turbine the APR-2E is a very fast torpedo. In LWAMI the speed was lowered to compensate for the funny physics found on high-speed torpedoes making them less fast but with more range than in real life.

E45-75
Found on: SS-N-14 Missiles
Speed: 38 Knots
Range: 4.3 nm
Warhead: 90 kg
Active Homing
Notes:

L5 Mod 4P
Found on: French Warships and Subs
Speed: 35 Knots
Range: 3.7 nm
Warhead: 300 kg
Active/Passive Homing
Notes: Strangely Wide (533mm) French Torpedo packs a good-sized warhead but with very little range to show for it.



Stingray
Found on: UK built Ships and ASW Aircraft
Speed: 45 Knots
Range: 4.3 nm
Warhead: 140 kg

Active Homing
Notes: Top of the line British torpedo made to defeat the Alfa class submarines. Low range gives you a chance if you can fool its high tech sonar. During the Falklands War these were deployed unsuccessfully against the *Balao* class ARA *Santa Fe*.

Mk 44
Found on: Some S-2 Trackers, Alouette Helos (Pakistan, France), Chetak Helos (India)
Speed: 30 knots
Range: 3 nm
Warhead: 34 kg
Active Homing

Notes: Older US built ASW torpedo. You won't normally encounter this weapon as a few units only carry it. About as effective as the A 244, although the Mk 44 can dive deeper but has a less advanced seeker.

Mk 46
Found on: ASROCs, US built ASW Aircraft and Ships
Speed: 45 Knots
Range: 6 nm
Warhead: 120 kg
Active/Passive Homing
Notes: Common US built torpedo. Used by about half the counties in DW.

Mk 50
Found on: US ASW Aircraft and Ships
Speed: 55 Knots
Range: 7 nm
Warhead: 140 kg
Active/Passive Homing
Notes: Best US ASW torpedo.

Mk 54
Found on: US ASW Aircraft and Ships, AS-355 helos
Speed: 50 Knots
Range: 6 nm
Warhead: 120 kg
Active/Passive Homing

Notes: Cheaper alternative to the Mk 50, not as fast or as powerful but still a very dangerous torpedo.

SET-65 "Yenot-2"
Found on: Neustrashimy, Krivak, and Indian Kashin class, older Russians submarines
Speed: 35 Knots
Range: 7 nm
Warhead: 205 kg (Equivalent to 300 kg ingame)
Active Homing
Notes:

USET-95
Found on: Koni Class Frigates
Speed: 50 Knots
Range: 5.5 nm
Warhead: 60 kg
Active/Passive Homing
Notes: Post Cold War Russian torpedo. It will take more than one of these to sink a Kilo.

Appendix B
Surface ship decoys
The countermeasures of surface warship vary country by country specifically important to the Kilo Skipper is what ships carry OTS decoys and which carry towed decoys. Listed below are the ships that have OTS decoys, ships not listed either have a towed decoy or no decoy (mostly support ships, small combatants or older warships.) Consult the in game USNI Browser, which tells if a towed decoy installed.

Invincible CVH
Kara class CG
Udaloy class DD
Sovermennyy class DDG
Neustrashimy class FF
Charles De Gaulle class CVN
Yarrow class FF

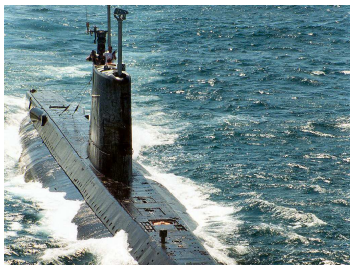
Appendix C
Your counterparts

Japanese *Harushio* class SSK
Speed 20 knots
Max Depth 263 m
Weapons:
Six Torpedo Tubes
14 Type 89 Heavyweight Torpedoes
6 UGM-84 Harpoon Missiles
ZQQ 5B Hull mounted sonar, ZQR 1 Towed Sonar Array

Australian *Collins* Class SSK
Speed 20 knots
Max Depth 330 m
Weapons:
Six Torpedo Tubes
16 MK 48 Torpedoes
6 UGM-84 Harpoon Missiles
Scylla bow and flank arrays, Narama or TB 23 Towed Sonar Array

German *Type 206* Class SSK
Speed 17 knots
Max Depth 200 m
8 Torpedo Tubes
8 DM 2A3 torpedoes
DUUX 2, 410 A4 Bbow Sonar, and TAS-3 Towed Sonar Array

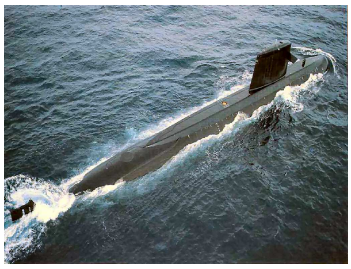
French (Pakistan) *Agosta* Class SSK
Speed 20 knots
Max Depth 330 m
4 Torpedo Tubes
18 F 17 Torpedoes
2 UGM-84 Harpoon Missiles
Thomson-Sintra sonars, TSM 2933 Towed Sonar Array



French (Pakistan) *Daphne* class SSK
Speed 16 knots
Max Depth: 328 m
12 Torpedo Tubes
8 E15 Torpedoes
4 UGM-84 Harpoon Missiles
Thomson-Sintra Bow Sonars.

Dutch (Taiwanese) *Hai Lung* class SSK
Speed 20 Knots
Max Depth 300 m
6 Torpedo Tubes
28 SUT Torpedoes
Hull and Sphere sonars

Argentine *Santa Cruz* class SSK
Speed 25 Knots
Max Depth 328 m
8 Torpedo Tubes
22 SST-4 Torpedoes
Hull and Sphere sonars



German (Brazilian) *Type 209* class SSK
Speed 22 knots
Max Depth 273 m
8 Torpedo Tubes
16 Tigerfish Torpedoes
Hull and Sphere sonars

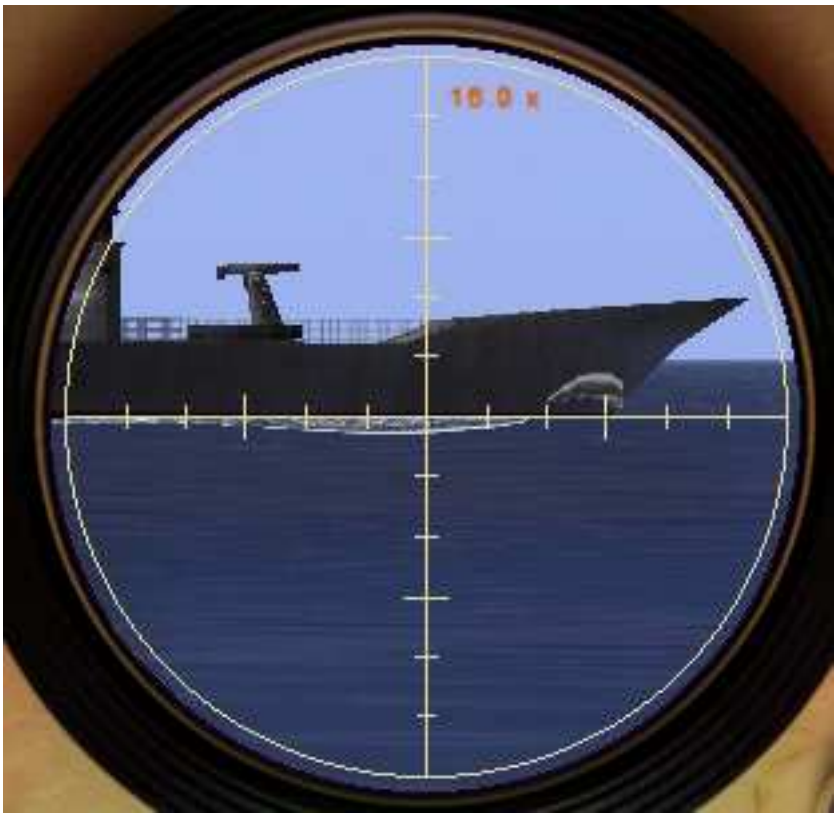
Chinese *Song* class SSK
Speed 22 Knots
Max Depth 263
6 Torpedo Tubes
6 Yu-3 Torpedoes
6 Tu-4 Torpedoes
6 C-801 Missiles
Hull and Sphere sonars

Chinese *Ming* class SS
Speed 18 knots
Max Depth 328 m
10 Torpedo Tubes
10 Yu-3 Torpedoes
6 Yu-4 Torpedoes
Hull and Sphere sonars

Russian (Indian) *Foxtrot* class SS
Speed 18 knots
Max Depth 328 m
10 Torpedo Tubes
16 SAET-60 Torpedoes
6 SET-65E Torpedoes
Hull and Sphere sonars

Appendix D
Bow Wave Reference
Below are sample bow waves from the Oliver Hazard Perry class FFG. Note not only the vertical size of the wave but the length along the hull of the wave. The length along the hull is generally indicative of speed in DW.
5 Knots

10 Knots



15 Knots

20 Knots

25 Knots

29 Knots

10.0 x

“I will require the names of those responsible!”

Writer, Editor, and all around cool guy: TLAM Strike

Thanks to LuftWolf and Amizaur for making the 3M-54E ASM much more realistic, getting rid of that damn SET-53ME, and just making DW so much better.

Thanks to Bill Nicholas for the collections of images that I borrowed from to make this document much more interesting looking.

Thanks to Luger Styra for his DB Editor that was invaluable in finding out the true capabilities of many weapons and platforms listed in this document.

Thanks to Fleet Submarine.com for the Fleet Submarine Operating Manual that covers lookout procedures.

Thanks to the Rubin design bureau for making such a cool little boat. ;)